ZFW

Applicants McCallister, et al.

Serial No.: 10/718,505

Filed: November 20, 2003

Group Art Unit: 2611

Examiner: CORRIELUS, Jean B.

For: CONSTRAINED-ENVELOPE DIGITAL-COMMUNICATIONS TRANSMISSION SYSTEM AND METHOD THEREFOR

INVENTOR'S DISCLOSURE AND DECLARATION UNDER 37 C.F.R. 1.56

I, Ronald D. McCallister, a named inventor in the above-identified reissue application, make the following disclosure and declaration pursuant to my obligation under 37 C.F.R. 1.56. My sole motivation in making this submission is my obligation under 37 C.F.R. 1.56(b)(2), which requires that I make known to the USPTO any information that "refutes, or is inconsistent with, a position the applicant takes in asserting an argument of patentability." There are currently four positions that the applicant, Intersil, is taking in asserting patentability of pending claims which require me to provide refutation to the USPTO: 1) Intersil's position with respect to my motivation in responding to the USPTO; 2) Intersil's position regarding the delay function; 3) Intersil's position regarding the linear amplifier; and 4) Intersil's positions with respect to each of the specific claims that I addressed in my previous submission in Application Serial No. 10/718,507 (November 2007). In the absence of Intersil's suitable response to each of these positions, I must again comply with my duty and provide the following information and material to the USPTO.

I. Regarding My Motivation and "Interest" in this Matter

As I explained to Intersil in a letter dated June 27, 2005 (attached as Exhibit A), I did not originally intend to respond to Intersil's flawed applications (U.S. Serial Nos. 10/718,505 and 10/718,507), but to simply address them in future litigation if necessary. However, my legal counsel informed me that my duty under 37 C.F.R. 1.56(b)(2) extended to applications in which I am a named inventor irrespective of whether I have any financial interest in such applications or whether I have any affiliation with the assignee, and I have conscientiously tried to fulfill that duty. I was compelled to make my submissions because of Intersil's failure to correctly advise the Examiner on several issues. That is the sole reason and motivation for my submissions, which have required much time and expense to generate. Intersil has falsely claimed that I have an "adverse" interest in these applications because, according to Intersil, my present company, CrestCom, may be required to pay royalties (to Intersil). Intersil's allegations as to my motivation are baseless and instead are an attempt to divert the Examiner's attention from Intersil's own questionable conduct. I clearly stated (in an email to Intersil dated August 13, 2003; Appendix 2 in Paul Bernkopf's Declaration submitted June 11, 2007) that:

a) "We do not believe that our approach infringes on Intersil's patents for CERN [acronym for the subject matter of the present application – 'Constrained Envelope Root-Nyquist']";

1121809 v1

b) "While we believe that our new approach does not infringe on CERN, an exclusive license to CERN might nonetheless be valuable to CrestCom." We explained that the value to CrestCom would be to preclude competitors from using CERN, forcing them to use the third-best approach (after ours and CERN); the third-best alternative is ~1dB worse than CERN, so owning an exclusive license to CERN would increase our performance edge by an additional decibel.

c) The May paper provides "a precise description of CERN . . . It clearly constitutes prior art, and might render the single-signal CERN patents unenforceable. We are interested in your opinion."

CrestCom approached Intersil with candor, clearly stating that CrestCom's interest in a license to CERN arose, not because CrestCom believed it would infringe on CERN, but to preclude CrestCom's competitors from using it. I clearly stated my opinion that the May paper described the same approach as CERN, and invited Intersil to respond, so that CrestCom and Intersil could reach an ethical conclusion. In spite of the fact that I, the principal inventor, had raised such a strong alarm over the patentability of CERN, Intersil elected to ignore the stated concerns and refused to notify the USPTO of my position. Moreover, if Intersil felt that my opinion might in any way be biased, Intersil could easily have solicited the technical opinions of either of the two co-inventors, one of whom continued to work for Intersil. I have contacted both my co-inventors (Dr. Bruce Cochran and Dr. Brad Badke); the opinion of neither co-inventor was solicited by Intersil regarding the equivalence of the May/Rohling approach and CERN. It is inconceivable to me that Intersil would elect not to inform the USPTO of this serious issue and the principal inventor's opinion, or to at least obtain a contradictory opinion regarding May from the co-inventors prior to submitting these patent applications.

Until recently, evidence that CrestCom's peak-reduction approach uses a much different concept than CERN was not available to Intersil, and thus may explain Intersil's unjustified accusations regarding my motivation. However, descriptions of CrestCom's approach are now in the public record, as awarded U. S. Patent Nos. 7251463 and 7295816, and as U.S. Patent Publication No. 20070254592. Review of these descriptions clearly shows that they depend on an entirely different conceptual approach; they do NOT subtract suitably scaled versions of a fixed pulse-shape like both CERN and May/Rohling. Instead they use a much more complex processing approach to achieve far superior peak-reduction. Had I realized that the approach described in CrestCom's most recent patent application would provide performance over 5dB superior to CERN, I would not have bothered asking about a CERN license. However I didn't develop this new approach until several years after 2003; I simply did not know how well I might be able to solve this challenging problem back in mid-2003, and as CEO of CrestCom, I needed to explore all possibilities. I can state with assurance now that CrestCom has no interest in even a free license to CERN; its performance level is simply too poor to be of any use or interest to CrestCom. That fact does not, however, obviate my responsibility to the USPTO in applications in which I am a named inventor.

II. Intersil's Positions Regarding the Delay Function

Compliance with my duty demands that I provide clarification to the USPTO, but I confess that I cannot fully understand what position Intersil is currently taking regarding the delay function.

Initially Intersil's position was crystal clear. In the submission dated May 18, 2006, Intersil's hired expert, Neil Birch, stated this position:

11. "The delay in May to make "the pulse peak and the signal peak . . . time-coincident" would be a variable delay.

12. The delay in May to delay "the input signal . . . by at least half of the pulse-shape duration" would be a variable delay; and

13. It is my opinion that one of ordinary skill in the art would not be able to devise a variable delay circuit to make "the pulse peak and the signal peak . . . time-coincident" in May without undue experimentation.

Each of these positions is directly contradicted by my statement that the required delay is fixed, rather than variable. Mr. Birch's confident statements and extensive qualifications momentarily gave me pause. However, I have an advantage over Mr. Birch in that I know what actually happened, i.e.,:

1) I employed several teams of engineers to develop several independent detailed computer simulations of this approach, and we developed an integrated circuit for the U.S. government that incorporated CERN. In each of these cases, we used a fixed delay, not a variable delay – and they all worked; and finally,

2) The engineer, Brad Badke, first assigned to develop a computer simulation of CERN spent only a few days constructing it, although he was my least experienced engineer. With no guidance, he quickly deduced that a fixed delay was required. The two days were spent in debugging his code; no part of the CERN concept posed a noteworthy challenge, including the delay.

Given this background, I quickly realized that Mr. Birch's strong statements could only indicate a complete lack of understanding of May's paper. To this date, I have yet to see any concession that Birch was completely in error in his earlier strenuous disagreement with my position regarding delay. If Mr. Birch and Intersil now realize their error, an apology would be appropriate in light of their repeated questioning of my integrity and competence.

In Intersil's most recent submittal, "Response under 37 C.F.R. §1.173," in the section titled "Rejections under 35 U.S.C. §112," Intersil states its new position:

> "Applicant respectfully asserts that one of ordinary skill in the art would understand that the delay in the signal path is constant and thus the delay is fixed. Therefore, the application meets the written description requirement to support the "fixed delay" limitation of the claim. Withdrawal of the rejection is respectfully requested."

Now I am truly confused. If Intersil continues to stand by its expert's earlier declarations that the delay is variable, not fixed, then I have a duty to continue to refute this nonsense. On the other hand, if their recent statements indicate that they finally see their error and admit that my statements have been correct all along, then it seems that I still have a duty to refute their most-recent statement to the USPTO. Specifically, it seems impossible to assert that "one of ordinary skill in the art would understand that the delay is constant" after their self-described expert reached the opposite conclusion. I interpret my duty to "refute a position the applicant takes in asserting an argument of patentability" as requiring me to now argue against Intersil's claim, since either: 1) one of ordinary skill would have great difficulty seeing that the delay is constant, or, 2) Mr. Birch lacks even an ordinary level of skill, let alone expertise. If I could determine a consistent Intersil position, I could dispense my duty to the USPTO. But since I cannot

determine a consistent Intersil position regarding delay, I interpret my duty as requiring me to inform the Examiner of this critical inconsistency.

III. Intersil's Positions Regarding the Linear Amplifier

In his June 2007 Declaration, Intersil's technical expert, Mr. Birch, made much of my citation of the following quote from the May paper:

> "This means that the signal is amplified linearly up to a maximal input amplitude A_0 and larger amplitudes are limited to A_0, see Fig. [1]. Based on this assumption, we also model the amplifier as an ideal limiter with amplitude threshold A_0 in this paper."

According to Mr. Birch:

> "McCallister's representation of the teaching of May regarding use of a linear amplifier as set forth in the claims of the above-captioned application totally mischaracterizes the content of the May reference. The amplifier described in May is modeled as an "ideal limiter" with normalized input and output amplitudes as shown in Fig. 1. The amplifier described in May is a classic form of non-linear amplifier. Persons skilled in the art would understand that the amplifier modeled in May is a non-linear amplifier, contrary to Mr. McCallister's conclusion."
>
> Persons skilled in the art would not find the subject matter of the claims of the above-captioned application requiring quadrature phase-point signal streams and a linear amplifier disclosed in, or obvious from, the teaching of May because the core teaching of May is to generate and apply a correcting signal that is tailored to the non-linearity of the amplifier used in the system."

Mr. Birch contends that the amplifier characteristic depicted in Figure 1 of the May paper (shown below as Figure 1 herein) is that of a non-linear amplifier, and that Intersil should therefore be granted claims covering use of peak-reduction in conjunction with a "substantially linear" amplifier. I believe Mr. Birch's contention is devoid of technical merit. May and Rohling "assumed that it can be achieved by predistortion of the signal that the amplifier behaves like an ideal limiter." (Recall that the authors are German; English isn't their native language.). Echoing May, I merely stated that many modern wireless transmitters use predistortion to effectively linearize the amplifier, and that any such predistorted amplifier will have a characteristic approximating that of May's Figure 1.

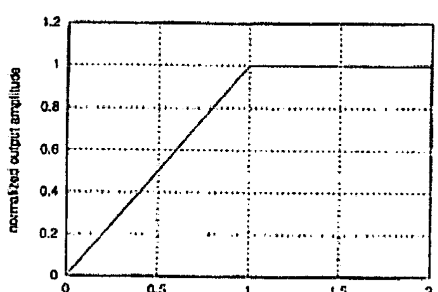


Figure 1.
Ideal limiter with normalized input and output amplitude, maximal input amplitude $A_0 = 1$.

Either May's Figure 1 accurately depicts the ideal linear amplifier, or it depicts a non-linear amplifier as claimed by Mr. Birch. Whether Intersil's claims directed to a "substantially linear" amplifier are patentable on this basis depends on this determination. This is a critical issue. I thus must be sure it is clearly understood. To that end, I provide below a few

background paragraphs describing the nature of an "ideal linear amplifier" and of the relationship between amplifier linearity and peak-reduction. This explanation makes very clear that Mr. Birch's comments to the USPTO are grossly incorrect and misleading.

A. <u>Amplifier Models</u>

A thorough assessment of accurate models for various amplifier characteristics was compiled by the 802.16 standards group during 2000 [<u>**www.ieee802.org/16/tg1/phy/pres/802161pp-00_15.pdf**</u>]. In general, the most common model for spacecraft amplifiers (e.g. traveling-wave tube amplifier (TWTA)) is the Saleh model; the most common model for solid-state/field-effect-transistor (FET) amplifiers is the Rapp model. Figures 2(a) and 2(b) depict these amplifier characteristics.

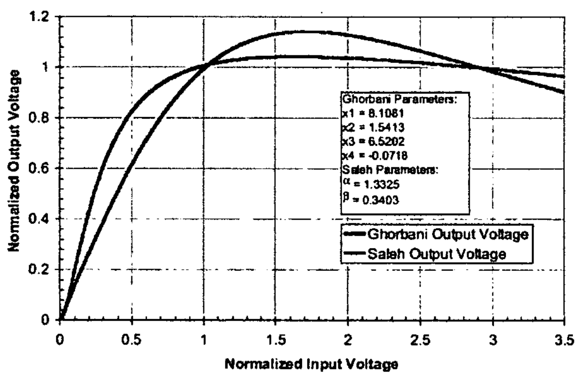


Figure 2(a). TWTA Amplifier Models

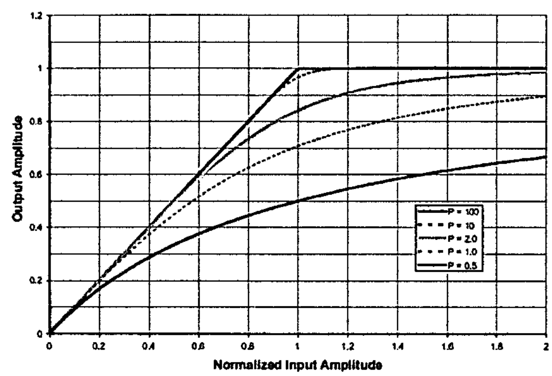


Figure 2(b). Solid-state/FET Rapp Model for Various Amplifier Parameter Values

The popularity of the Rapp model for solid-state amplifiers is partly due to the ease with which this model accommodates various degrees of linearization. As the value of the Rapp parameter (**p**) increases, the amplitude characteristic more closely approximates the ideal piece-wise linear characteristic. The fundamental issue is: for high p value, does the Rapp model approximate an <u>ideal linear amplifier</u> - or an <u>ideal non-linear amplifier</u>?

The answer requires recognition of the following fundamental fact: all real amplifiers exhibit a maximum (saturation) output voltage/power level, and so there can never be a truly "linear" amplifier - that would require an infinite output power. The real question is "what transfer characteristic would the "ideal linear" amplifier exhibit, and would it match May's Figure 1, as I have asserted?

All amplifiers exhibit a peak output power/voltage, and so their transfer characteristic must resemble the Rapp model for some value of p, with the possibility that further increases in input signal amplitude might actually result in a drop in output level, as is typical of TWTA amplifiers. Their transfer characteristic will always be linear for very low input signal amplitudes, then eventually reach a point where their slope is zero; that is, the transfer curve must become horizontal at saturation. Given this fact, the pertinent question is what amplifier transfer characteristic should be defined as that of the "**ideal linear amplifier**?"

Referring to Figure 2(b), note that the transfer curve corresponding to each value of the parameter **p** provides a different range over which the relationship between the input and the output remains linear. Spurious energy is generated when a signal passes through an amplifier that exhibits anything other than an exactly linear relationship between input and output, forcing

1121809 v1

users to "backoff" (reduce the maximum value of the input signal) from the saturation output level of the amplifier to preserve linear operation. Figure 2(b) clearly shows that increasing values of **p** permit a user to obtain ever higher output levels from their amplifier while maintaining fully linear amplifier operation. The transfer characteristic corresponding to a value of 100 for **p** allows the amplifier to generate an output value of unity when the input signal amplitude is unity; this output amplitude is far greater than for any lower **p** value. For this reason, the amplifier transfer characteristic associated with such very high values of p is known to represent the "**ideal linear amplifier.**"

The goal of an amplifier designer is to try to approach the ideal linear amplifier characteristic as closely as possible. It is disingenuous for Intersil to claim that this ideal linear amplifier characteristic is actually a non-linear amplifier, not a "substantially linear amplifier." Dr. Rohling (co-author of the May/Rohling reference) is a highly respected engineering professor, and the paragraph describing his assumption that the amplifier will be approximated by this idealized (piece-wise) linear amplifier is crystal clear to any reader of reasonable skill in the art. The essence of Mr. Birch's semantic argument is this: as an amplifier ever more closely approaches that of the ideal linear amplifier, it stops being a linear amplifier at all, and actually becomes ***non-linear***. This sophistry begs the question, i.e., for which increasing value of **p** in the Rapp model does the amplifier suddenly cease to be "substantially linear" and become non-linear? It is likely already clear that Mr. Birch's argument is false and misleading, but as I stated, this issue is so critical to judging the merit of Intersil's arguments that I will provide further evidence demonstrating the fallacy of those arguments.

B. <u>Pre-distortion Linearization of Amplifiers</u>

Practical limitations in amplifier design make it impossible to approach the ideal amplifier very closely by altering the design of the physical amplifier itself. To further widen the linear region of operation, it becomes necessary to alter the signal waveform itself, so that the net impact of such signal 'predistortion' and the physical amplifier results in an effective transfer function that more closely resembles the ideal linear characteristic; again, recall that the ideal linear amplifier characteristic is the piecewise-linear characteristic depicted in Figure 1 of the May paper.

C. <u>Linear Amplifier Characteristics</u>

Efficient power amplifiers exhibit an intrinsically non-linear relationship between input and output power. A typical relationship between amplifier input and output power is depicted in the dashed curve in Figure 3 below. For low levels of input power, the amplifier output signal is a linearly-amplified replica of the input. However, at higher input signal power levels, the amplifier output reaches the amplifier saturation level. Operation of the amplifier beyond its linear amplification region generates unacceptable non-linear noise violating regulatory spectral masks, forcing operation at a lower input power level. Extensive technical literature and patents describe numerous techniques that can be used to 'linearize' the amplifier, mitigating the non-linear characteristic, and approaching the ideal linear relationship shown in the solid curve in Figure 3.

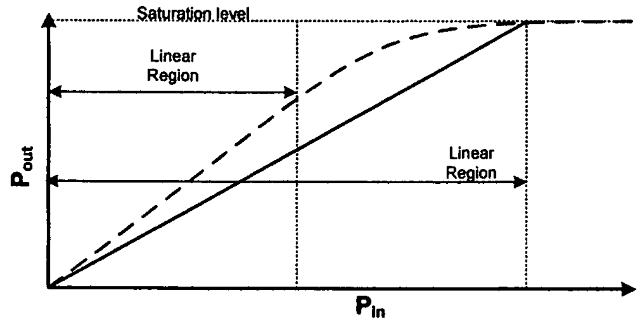


Figure 3.
Amplifier Characteristics:
Non-linear and Linearized

Any amplifier exhibits a maximum output power and a maximum gain (the slope over the linear region). The goal in linearizing any amplifier is to achieve linear amplification right up to the point that the maximum output power is achieved. This is such an important point in refuting Mr. Birch's statement that it warrants further expansion, which I provide below. I will then show that ***every "substantially linear" amplifier can be transformed, using signal predistortion processing, into a more linear amplifier, one that more closely approximates the ideal linear amplifier – the piecewise linear amplifier depicted in Figure 1 of May's paper.***

Consider the amplitude transfer characteristic of an arbitrary "substantially linear" amplifier, depicted as curve 100 (dotted) in Figure 4. Dozens of patents have been awarded over the past few decades covering various concepts for linearization by signal predistortion. The net effect of all such predistortion-based linearization is to increase the linear region of operation of the amplifier, while still maintaining the same amplifier gain (i.e. its linear region slope) and amplifier saturation level; curve 110 (dashed) represents the amplifier characteristic modified by such predistortion linearization. The complexity of linearization processing increases rapidly as one further extends the amplifier's linear region, and linearization becomes impractical before it is possible to achieve the ideal linear amplifier characteristic, the piecewise-linear characteristic depicted in curve 120 (solid). Nonetheless, it is critically important to appreciate that all "substantially linear" amplifiers may be made 'more linear' by applying predistortion linearization techniques.

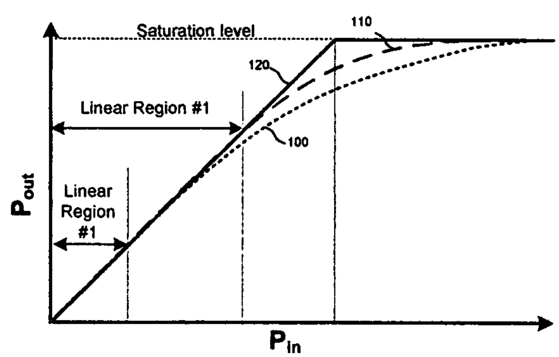


Figure 4.

Linearization Applied to
"Substantially Linear"
Amplifier Characteristic

The most important result from this discussion is an understanding of Dr. Rohling's Figure 1 and associated text. He clearly was not suggesting restriction of peak-reduction processing to use only with an ideal linear amplifier; since the primary focus of May's paper was peak-reduction processing, he simply assumed that predistortion linearization would be used to render the actual amplifier as close to an ideal linear amplifier as needed. I can only assume that Mr. Birch's gross misunderstanding of Figure 1 was due to the fact that Dr. Rohling's native tongue is German, and his proffered explanation might not be readily grasped by an engineer inexperienced in predistortion linearization. However, Dr. Rohling's explanation was crystal clear to any engineer with the appropriate technical background.

D. <u>Signal Peak Reduction</u>

Amplifier nonlinearities convert input signal energy into nonlinear spectral energy that violates regulatory spectral masks. It is therefore advantageous to limit the signal magnitude into the amplifier so that it only rarely extends beyond the linear region of operation. As Figure 4 shows, the value of amplifier linearization is that it can greatly extend the upper limits of the amplifier's linear region. After the amplifier has been linearized to the practical limit, generation of unwanted nonlinear spectral components may be further reduced by limiting the likelihood that the signal magnitude extends beyond the amplifier's linear region. Unwanted nonlinear components will be generated whenever signal peaks extend beyond the amplifier's linear region; this motivates peak-reduction processing.

Figure 5 depicts the magnitude probability density function (pdf) for a typical signal; the curve's height is proportional to the probability of any specific signal magnitude; it exhibits a very long tail, implying that very large values of signal magnitude can occur, albeit with declining likelihood for larger magnitude. Peak-reduction processing alters the signal to effectively eliminate the likelihood that signal magnitude exceeds some threshold value, modifying the magnitude pdf from that depicted in Figure 5 to that depicted in Figure 6. Since pdf curves are normalized so that the area under the curve must always equal unity, reducing the likelihood of very large magnitudes results in the shifting of that probability (area) towards smaller magnitude values. The vertical line represents the magnitude threshold value.

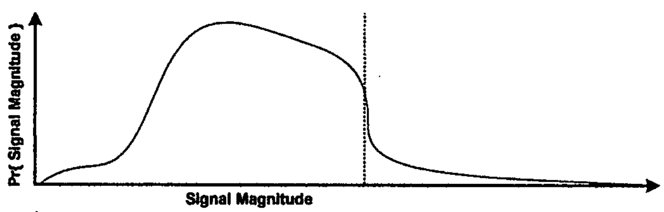


Figure 5.
Signal Magnitude pdf

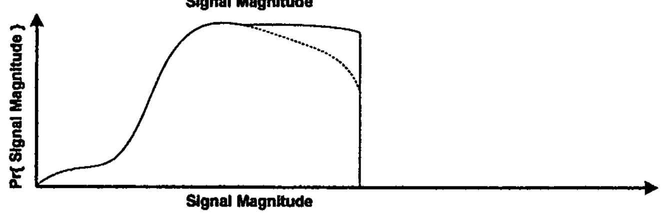


Figure 6.
Peak-Reduced Signal Magnitude pdf

Note that peak-reduction permits the signal to enter the amplifier shifted further to the right whether or not linearization is used. If both peak-reduction and linearization are used, the signal input power level may be increased (i.e. shifted to the right) so that the signal magnitude threshold is identical to the upper limit of the amplifier linear region. This yields the maximum operating efficiency possible with that signal and that amplifier, resulting in substantially higher average power in the transmitted signal.

Figure 7 depicts a peak-reduced signal at two different input powers with respect to a linearized amplifier. In both cases, the amplifier operation is entirely linear, since the entire signal magnitude range lies within the amplifiers linear region of operation. However, the amplifier output power is greater when the input signal has been pre-amplified so that its magnitude peaks align with the amplifier's maximum linear limit, as illustrated by the pdf curve that has been shifted to the right.

1121809 v1

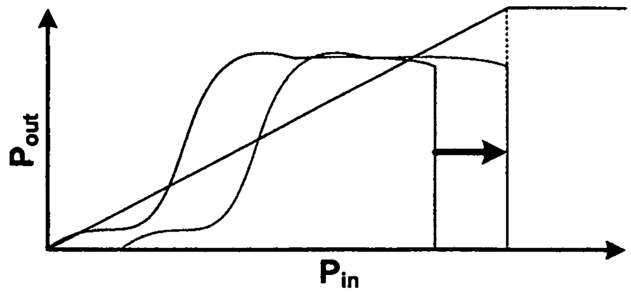


Figure 7.
Optimized Relationship between Peak-reduction and Amplifier Linearization

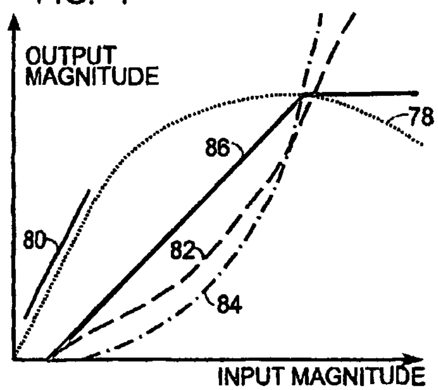
Figure 7 graphically depicts the key relationships between peak-reduction and amplifier linearization. It should be clear that the goal is to minimize the signal's peak-to-average power ratio (PAR) value, the vertical boundary to be aligned with the maximum linear limit of the amplifier. Every 1dB reduction in PAR increases the maximum average amplifier power output by an extra 1dB. A 3dB reduction in signal PAR can reduce the cost of a basestation amplifier by thousands of dollars, providing a significant economic incentive for peak-reduction processing. It is obvious that **maximizing the average power of the transmitted signal requires that both aspects of the problem be addressed**: The **signal's peak-to-average power ratio must be minimized**, and **the amplifier must be linearized** to render its transfer characteristic as close as practical to that of an ideal linear/limiting amplifier. Signal predistortion processing can always further reduce the difference between the smooth curve and the ideal linear amplifier characteristic, but the implementation complexity of the linearizer increases rapidly, so that practical linearized amplifiers typically correspond to Rapp parameter (p) values between 1 and 10.

It is so critically important that it bears repetition: the most linear amplifier characteristic achievable is the piecewise-linear one depicted in Figure 1 of the May/Rohling paper. This can be validated either by simple reason, as demonstrated above, or by consultation with any practicing signal processing engineer. Many patents (e.g., U.S. Patent Nos. 5138275, 5598127, 6307435, 6429740, 6577192, 6587514, 6798843, 7058369), including many that predate the present application, explicitly include these "ideal linear amplifier" transfer characteristics, indicating how wide-spread this notation is in the engineering community. Numerous technical papers mirror this usage.

In U.S. Patent No. 7088958, titled "Remote Power Amplifier Linearization," my co-inventor, Dan Shearer, and I clearly describe the goal of amplifier linearization to be to adaptively alter the shape of any substantially linear amplifier characteristic into one that more closely resembles the ideal piecewise linear characteristic in May's Figure 1. It seems particularly disingenuous for Intersil, the owner of this patent, to now denounce this ideal linear amplifier as actually a "non-linear" amplifier. At the very minimum, one would expect consistency in applying such terms. The text and figure below are excerpted from that Intersil patent.

FIG. 4 also shows a trace **82** and a trace **84** depicting hypothetical linearizer transfer functions as may be implemented by power amplifier linearizer **66** (FIG. **3**). The purpose of implementing linearizer transfer functions **82** or **84**, as may be appropriate to a given situation, would be to cause the overall signal at the output of power amplifier **74** (FIG. **3**) to exhibit as closely as possible the linear transfer function depicted in a trace **86**. Linear transfer function **86** has a linear range of operation that exceeds range **80** of non-linearized power amplifier **74**. When deemed necessary by a hub radio **22** (FIG. **1**), commands may be issued to cause user radio **24** to adjust its linearization transfer function, such as from transfer function **82** to transfer function **84** or vice-versa. Those skilled in the art will appreciate that the complex signal processed by linearizer **66** and power amplifier **74** may exhibit other distortions than the AM/AM distortion depicted in trace **78**. Such other distortions may include AM/PM distortion. Nothing prevents linearizer **66** from providing transfer functions as necessary to address these and other types of distortion.

FIG. 4



I include the large number of patents citing the piece-wise linear amplifier characteristic as representing the ideal amplifier and the goal of all predistortion linearization to make an important point: while any single technical article or patent may well contain a technical error, it is impossible for all these diverse experts to be in error over such a long period. While these many references do support this contention, I understand that it is also important to demonstrate that at least one such reference was publicly available contemporaneously with the publication of the May paper. To satisfy this requirement, the following paragraphs present such publicly available material.[1]

"II. HPA Modelization and Predistortion

A non-linear HPA [high power amplifier] can be characterized by its envelope distortion curves AM/AM and AM/PM. The RF input to an HPA x(t) is expressed by

$$x(t) = R_x(t)\cos[\omega_0 t + \theta_x(t)] \qquad (1)$$

The corresponding output y(t) is expressed by

$$y(t) = G[R_x(t)]\cos\{\omega_0 t + \theta_x(t) + \Psi[R_x(t)]\} \qquad (2)$$

where G and Ψ are respectively the AM/AM and AM/PM distortion curves. The distortion curves of the Itelco DAB Amplifier considered in this work are shown in Fig. 1 where the axis is normalized with respect to the Maximum Output Power.

[1] Andreoli S., et. al., "Digital Linearizer for RF Amplifiers," IEEE Transactions on Broadcasting, March 1997, vol. 43, issue 1, pp. 12-19.

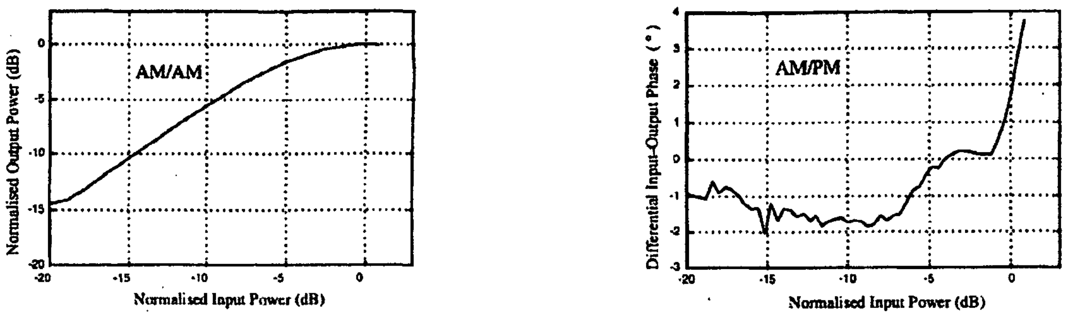


Fig. 1 Measured Amplifier Distortion Curves

A predistorting device, designed to counteract the nonlinear distortions introduced by the amplifier, has to implement two nonlinear functions H and Φ that globally invert G and Ψ. The cascade of the predistorter with the HPA gives rise to a pseudo-linear device (i.e. an ideal soft-limiting device) as showed in Fig. 2, where the resulting AM/AM and AM/PM curves for the predistorted amplifier are shown.

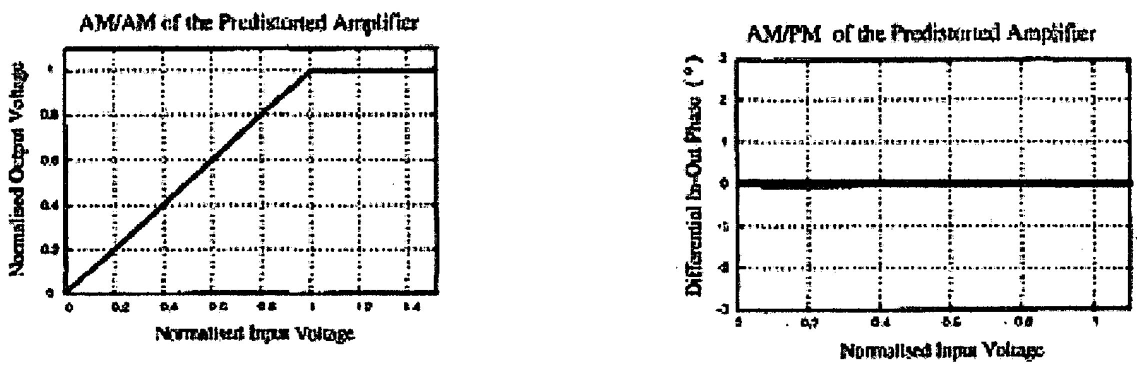


Fig. 2 Predistorted Amplifier Distortion Curves"

The preceding material was publicly available in March 1997, and it clearly describes the desired goal of using predistortion linearization on a non-linear amplifier. May and Rohling, as recognized experts in signal processing, would have also been aware that predistortion linearization would likely be used in any system intending to use peak-reduction. May and Rohling therefore made the very reasonable assumption that the linearized amplifier characteristic depicted in their Figure 1 would be appropriate to use in analyzing their peak-reduction technique. It is unfathomable to me that Mr. Birch claims to be an expert in this area, and yet fails to comprehend even the nature of the goal that predistortion linearization tries to achieve.

It should be abundantly clear that Mr. Birch's sworn statements reflect lack of expertise, or even basic understanding, of amplifier linearization and peak-reduction processing. It should be clear that May/Rohling's incorporation of the "ideal linear amplifier" transfer characteristic in their Figure 1 was the proper assumption to make, reflecting the likelihood that predistortion linearization would be employed in addition to peak-reduction. It should further be clear that Intersil's attempts to claim innovation and allowance of claims for using peak-reduction with any "substantially linear amplifier" is without merit.

IV. Regarding My November 2007 Submission in App. Ser. No. 10/718,507

I provided, in my November 2007 submission in related Application Serial No. 10/718,507, detailed and specific technical reasons why many of the claims previously indicated allowable in that application should not be granted (i.e., at least claims 6-9, 24-27 and 47-50). Given the clarity and significance of those technical arguments, I was surprised and disappointed by Intersil's failure to offer a counter-argument on a single one of those claims. In the absence of any attempt to refute any of my explanations, I will not expand upon them in this submission. I will simply note that each of my arguments provided ample reason to reject each of the claims I addressed in that prior submission, and would appreciate if the Examiner, unlike Intersil, will take my submission into consideration in deciding whether to allow at least claims 6-9, 24-27 and 47-50 of Application Serial No. 10/718,507 to issue. Rather than respond to my submission on the technical merits, Intersil simply chose to rewrite dependent claims in independent form to try to obtain issuance of the claims in Serial No. 10/718,507 even though I have explained in great detail why those claims should not be issued. Intersil chose to address my submission in Serial No. 10/718,507 only as an attempt to further besmirch my credibility, and only in the present application, not the application in which I made the submission.

V. Summary

Finally, I wish to restate my response to Intersil's accusation that I represent an adverse interest towards their applications. My prior submissions have not deviated from point-by-point technical exposition regarding individual misrepresentations made by Intersil. I have included technical explanation only so far as essential to provide adequate understanding to appreciate why each claim is invalid, and I have spent much time sharpening my focus to avoid broad generalities. Since Intersil chooses either to submit or withdraw its misrepresentations, it is Intersil that dictates my actions. . Should Intersil elect to withdraw its misrepresentations, I will have no legal basis to communicate further with the Examiner regarding these applications.

My obligation under 37 C.F.R. 1.56 has required me to spend enormous amounts of time, energy and funds attempting to properly dispense my duty to the USPTO. Had Intersil only taken the time to understand my technical submissions, it would have realized that they reflect my technical expertise, my integrity and my duty to the USPTO, rather than self interest. I sincerely hope that this most recent submission will bring an end to Intersil's misrepresentations, so that I may be free to pursue other interests.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Ronald D. McCallister

Ronald D. McCallister
7701 E. Onyx Ct.
Scottsdale, AZ 85258-1135
(480) 998-3208

Dated: February 1, 2008

1121809 v1

Appendix A: Letter from McCallister to Bernkopf dated 6/27/05

Monday, June 27, 2005

Paul Bernkopf
Chief Intellectual Property Counsel
Intersil Corporation
2401 Palm Bay Road
Palm Bay FL 32905

Paul:

I must disclose to you information that is clearly material to your current application for reissue of patents 6,104,761, originally filed on 8/28/98 and issued on 8/15/00, and 6,366,619, originally filed on 8/9/00 and issued on 4/2/02. The reissue requests were based on an article by May et. al., "Reducing the Peak-to-Average Power Ratio in OFDM Radio Transmission Systems," published 5/18/98 in the Proceedings of the 1998 Vehicular Technology Conference. Your representative, Lowell Gresham, filed an Information Disclosure Statement (IDS), dated 11/19/03, to the USPTO, and simultaneously submitted an amended set of claims for both subject applications. I recently became aware of your reissue applications and, based on my understanding of my obligations as an inventor on the above patents, I must immediately make you aware of a serious error in your argument for allowance of claims in the reissue applications.

Recall that in my 8/13/03 memo to you I clearly stated that May's approach is "a precise description of CERN." Based on statements made by Intersil in the reissue application, it appears that you failed to appreciate that the two methods are not merely similar; the method (CERN) that we reduced to practice and May's method are identical in every detail. This is neither an opinion nor posturing for CrestCom's benefit; it is a simple statement of fact. I suspect that my acknowledgment that the USPTO might nonetheless award a patent may have confused you and Lowell. The USPTO sometimes errs and grants specious claims, so I simply considered that possibility. This in no way alters the fact that CERN is identical to May's method, and any representation to the USPTO to the contrary is a misrepresentation.

When I recently became aware of the USPTO/PAIR Website, I reviewed Lowell's correspondence regarding this re-issue application. Upon seeing that the examiner intends to grant the amended patent, I formulated two candidate strategies: 1) simply wait for Intersil to assert a flawed claim, then obtain a declaratory judgment; or, 2) approach Intersil and agree to ignore the material misrepresentation in exchange for a royalty-free license. Fortunately, we are currently formulating our comprehensive IP strategy with an experienced litigation firm, and they immediately informed me that my strategies were inconsistent with my obligations to the Patent Office. That was my humbling introduction to M.P.E.P. Section 2001.05, 'Materiality Under 37 CFR 1.56(b)(2)', which demands that I make known to the USPTO any information that "refutes, or is inconsistent with, a position the applicant takes in asserting an argument of patentability." I suspect that refuting Intersil's claimed distinction between May and CERN is not in CrestCom's best business interest, but that is irrelevant. I know that the two approaches are identical, and any representation to the contrary is a misrepresentation of a material fact. Regardless of the consequences, I am obligated to immediately inform the USPTO of this misrepresentation, either directly or through Intersil - hence this letter.

Intersil has argued to the examiner that the May paper makes no mention of the need to delay the input signal, and that based on inclusion of delay as a critical element in our claims, we deserve for our invention to be recognized as unique from the paper's teaching. This is factually incorrect. The paper teaches that you must identify the instant in time in which a signal peak occurs, and then subtract a scaled version of a fixed pulse-shape from the input signal, where the peaks of the pulse-shape and the signal have been time-aligned. Since the pulse-shape extends in both directions in time from the point at which its peak occurs, the teaching clearly requires that the input signal is delayed by at least half of the pulse-shape duration. In view of the foregoing, it is clear that May's approach inherently uses a delay; in my opinion it cannot be done any other way.

I would be remiss if I didn't directly address this issue: is this need for delay obvious to one of ordinary skill in the art? When I first conceived of CERN, I tasked one of my least-experienced engineers with generating a detailed computer simulation to implement the method and evaluate its performance. I provided no instruction to insert delay, directing only that a scaled version of the bandlimited pulse be aligned and subtracted from every excursion peak. Yet this engineer correctly implemented a signal delay of exactly half the pulse-shape duration; even an inexperienced practitioner recognized the need for signal delay. I submit this as compelling evidence that one of ordinary skill in the art would readily recognize the equivalence between these methods. Given my awareness of such history, you will appreciate the need for this letter.

I have reviewed your argument to the examiner in this regard, and although I assume the error was inadvertent, I cannot fulfill my obligations as an inventor if I let that error stand. I am sending this letter to notify you that, unless you concur with my assessment and terminate prosecution of this flawed application, I will shortly be submitting an IDS to the USPTO making clear these facts relevant to your reissue application. According to our legal counsel, this action is required to protect both my reputation and the integrity of CrestCom's pending and future patents against potential inequitable conduct charges.

I am troubled by these events, Paul. My position in the memo of 8/13/03 was clear, and even a cursory reading of May's paper would have revealed the serious flaw in the argument you submitted to the examiner. You have sought my advice on several other SiCOM patents over the past two years, and I've always given accurate and unbiased advice - so it would seem only prudent to verify this erroneous argument with either me or my co-inventors prior to its submission to the USPTO.

I will defer submission of my IDS until 7/5/05, in order to permit you to acceptably remedy this problem, but my own obligation for timely action precludes my delaying beyond that date.

I trust that you know that my sole intention is to do what is proper, and I truly hope that our required actions have no adverse impact on Dan Shearer's pending patents. This issue is unrelated to whatever business we may decide to pursue, individually or jointly, in the future, or to licensing issues; it is strictly focused on our disclosure obligations under existing patent law. Free to contact me (soon) if you need any additional clarification. A paper version of this letter will follow by registered mail. Sorry for the formal tone, Paul, but it seems appropriate given the subject matter and potential ramifications.

Respectfully,

Ron McCallister